SLU PreCalculus TEST 3 Fall 2008

NAME: ____________________________________Score____________________________/100

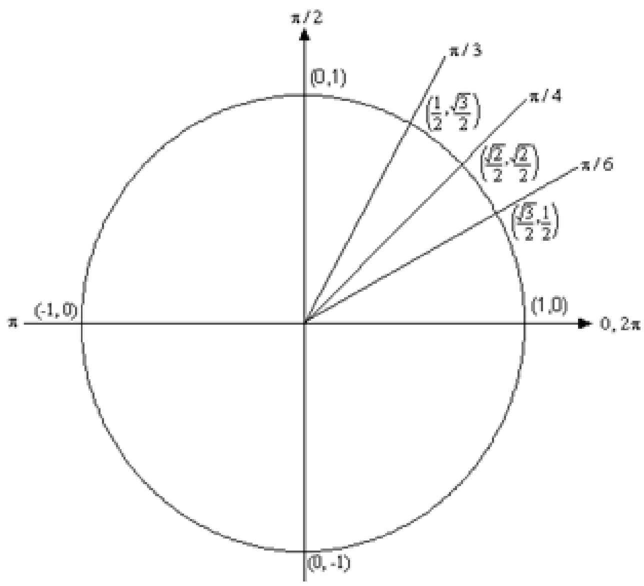
Please print

SHOW ALL YOUR WORK IN A NEAT AND ORGANIZED FASHION

The last page of this test contains formulas and facts which may be helpful. Detach it and use it.

Questions 1 - 10 are each worth 4 points. Questions 11 – 16 are each worth 10 points.

1. Find the **exact** value of sin(75°). A calculator should not be used.



2. What is the **exact** value of cos(330°)? __________

3. $(x-h)^2 + (y-k)^2 = 5$ is the equation of a __________________ with center at ______________

4. $\frac{(x-h)^2}{a^2} - \frac{(y-k)^2}{a^2} = 1$ is the equation of a __________________ with center at ______________

5. $\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{a^2} = 1$ is the equation of a __________________ with center at ______________

6. In a discussion of the $\sin^{-1}$ function the domain of sin function is restricted to the interval ________

7. In a discussion of the $\cos^{-1}$ function the domain of cos function is restricted to the interval _______

8. What is the solution set for the equation sin(x) = –2.______________________

9. A particular trigonometric equation involving only the sin function has solutions $\frac{\pi}{3}$ and $\frac{5\pi}{3}$ in the interval [0, 2π]. Write expression(s) for ALL real solutions of the equation.

10. Provide a counterexample to show that sin(x) – cos(x) = 1 is NOT an identity.

11. To find the all solutions of $5\sin(\theta) - 3 = 0$ in the interval $[0, 2\pi]$ we would write $\sin(\theta) = \frac{3}{5}$.

Then we would use the inverse sin function to obtain $\theta = \sin^{-1}(\sin(\theta)) = \sin^{-1}\left(\frac{3}{5}\right) \approx 36.87^\circ$.

Complete the analysis to find all solutions in the interval $[0, 2\pi]$

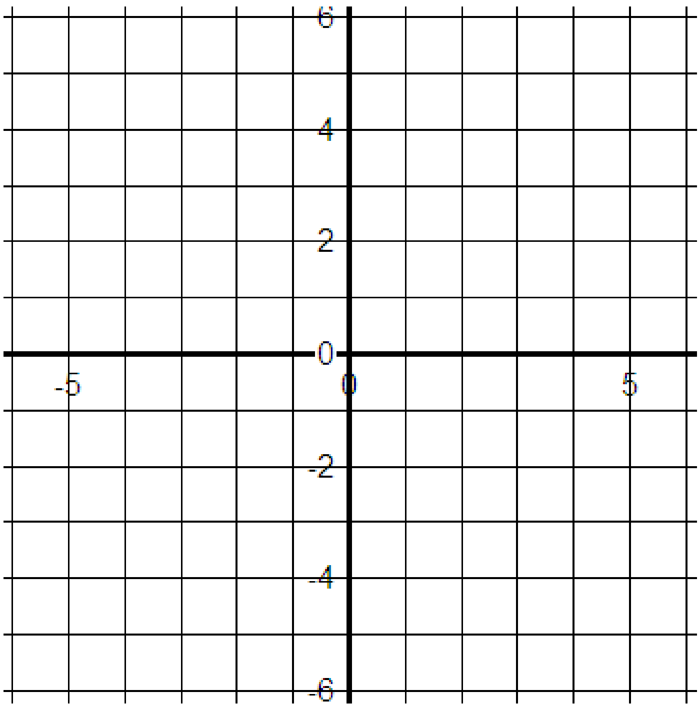
12. Prove the identity $(\sec(x) - \tan(x))^2 = \frac{1 - \sin(x)}{1 + \sin(x)}$

13. Find the **exact** value of $\cos(74^\circ)\cos(44^\circ) + \sin(74^\circ)\sin(44^\circ)$. Do not use your calculator.

14. In a triangle with the conventional labeling that has been used in class and text,
$a = 10.3, \quad c = 6.45, \quad \text{and} \quad \beta = 32.4^\circ$. **Calculate b**.

15. Solve the triangle (s) with a = 27, b = 62, and $\alpha = 81^\circ$. (Be thoughtful)

16. Sketch the graph of $\frac{x^2}{3} + \frac{y^2}{4} = 2$. Show and label (with coordinates) all vertices, Foci and any other important points



Useful Formulas and Other Information
This is for use with PreCalculus Test 3

Basic Facts:

For each real number x, the wrapping function W associates a point on the unit circle. The sine and cosine functions are defined as follows:

sin(x) is the second coordinate of the point on the unit circle

cos(x) is the first coordinate of the point on the unit circle

The other six trig functions may be defined by what are usually referred to as the reciprocal identities or quotient identities.

$\tan x = \frac{\sin x}{\cos x}$ $\quad \cot x = \frac{1}{\tan x} = \frac{\cos x}{\sin x}$ $\quad \sec x = \frac{1}{\cos x}$ $\quad \csc x = \frac{1}{\sin x}$

$\sin(0) = 0$ $\quad \sin\left(\frac{\pi}{6}\right) = \frac{1}{2}$ $\quad \sin\left(\frac{\pi}{4}\right) = \frac{1}{\sqrt{2}}$ $\quad \sin\left(\frac{\pi}{3}\right) = \frac{\sqrt{3}}{2}$ $\quad \sin\left(\frac{\pi}{2}\right) = 1$

$\cos(0) = 1$ $\quad \cos\left(\frac{\pi}{6}\right) = \frac{\sqrt{3}}{2}$ $\quad \cos\left(\frac{\pi}{4}\right) = \frac{1}{\sqrt{2}}$ $\quad \cos\left(\frac{\pi}{3}\right) = \frac{1}{2}$ $\quad \cos\left(\frac{\pi}{2}\right) = 0$

For Triangles:

$\sin(\theta) = \frac{opp}{hyp}$ $\quad \cos(\theta) = \frac{adj}{hyp}$ $\quad \tan(\theta) = \frac{opp}{adj}$

Law of Sines

$$\frac{\sin\alpha}{a} = \frac{\sin\beta}{b} = \frac{\sin\gamma}{c}$$

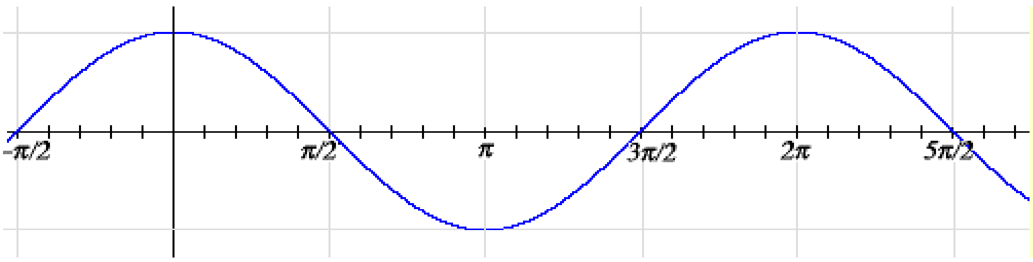
Law of Cosines

$$a^2 = b^2 + c^2 - 2bc\cos\alpha$$

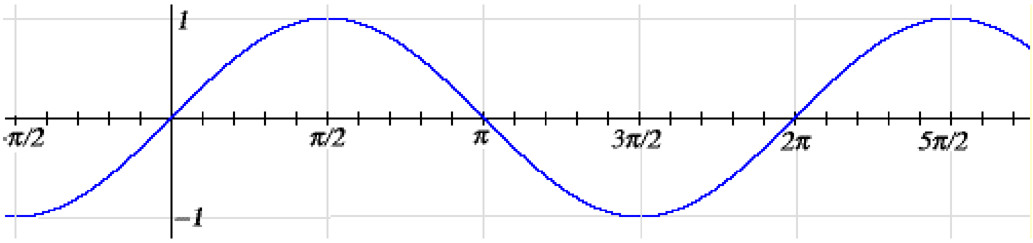
$$b^2 = a^2 + c^2 - 2ac\cos\beta$$

$$c^2 = a^2 + b^2 - 2ab\cos\gamma$$

The Cosine Function:



The Sine Function:



Identities:

cos (x – y) = cos(x)cos(y) + sin(x)sin(y)

cos (x + y) = cos(x)cos(y) – sin(x)sin(y)

sin(x – y) = sin(x)cos(y) – cos(x)sin(y)

sin(x + y) = sin(x)cos(y) + cos(x)sin(y)

sin(2x) = 2sin(x)cos(x)

$\cos(2x) = \cos^2(x) - \sin^2(x) = 1 - 2\sin^2(x) = 2\cos^2(x) - 1$